

Appl. No. : 09/684,150
Filed : October 6, 2000

13
determining the curvature of said foot from said imprint by calculating the rate of change of
said depth information at said one or more points.

REMARKS

This is in response to the Office Action mailed May 10, 2002. By this Response, Applicant has canceled Claims 14-18, has amended Claims 1 and 9, and has added new Claim 19. Claims 1-13 and 19 are now pending in the application after this Response.

By the Office Action, the Examiner indicated the rejection of Claims 1, 5, 7, 8, 9, 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Gould et al. (U.S. Patent No. 5,025,476) in view of Endoh (U.S. Patent No. 5,502,657), and indicated the rejection of Claims 2-4, 6 and 16-18 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Gould in view of Shishizuka (U.S. Patent No. 5,786,906). The Examiner indicated the rejection of Claims 10, 11 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Gould in view of Tamura et al. (U.S. Patent No. 6,040,860) and similarly rejected Claim 12 over Gould in view of Kull et al. (U.S. Patent No. 6,301,532).

Independent Claim 1

Amended independent Claim 1 discloses a method of determining the shape and size of a foot from an imprint of a foot formed in a compressible member. Claim 1 also recites a method including the steps of scanning the imprint and determining the depth, size and curvature of the foot from the image data of the imprint.

Appl. No. : 09/684,150
Filed : October 6, 2000

Applicant asserts that Claim 1 recites a method of determining the size and shape of a foot which is fundamentally different than the prior art, including Gould. Gould discloses a method and apparatus for determining the size and shape of a foot by "capturing and storing an image of the moire fringe pattern in an image storage buffer"(2:46-47). This information is obtained by directing light at the bottom of a foot which is located on a support plate (see Figure 2). In accordance with Gould's method, the "captured image contains the topographically encoded height and shape information carried by the moire fringes, which information may be determined by computerized analysis of the image" (6:41-45).

It will thus be appreciated that Gould's method of determining the size of a foot is fundamentally different than that claimed in Claim 1. Gould derives his information from an image created when light is directed at the bottom of a foot placed on a support plate. Gould does not teach or suggest generating foot size and shape information from an imprint of a foot formed in a compressible member. Further, Gould does not disclose a method of determining the curvature of a foot.

Applicant asserts that Endoh similarly lacks any teaching or suggestion of these features. In addition, Applicant asserts that the teaching of Endoh is inapplicable to Gould and even if combined with Gould, does not result in the invention as claimed.

Endoh discloses a method of using a single camera to obtain three-dimensional information regarding an object. (Col. 2, lines 52-56). This information is preferably used to control a robotic device (Col. 9, lines 17-21). At most, in accordance with Endoh, three-dimensional information is

Appl. No. : 09/684,150
Filed : October 6, 2000

obtained by comparing information regarding adjacent pixels, and not from the particular information regarding a pixel.

Gould already teaches using an image to measure the size of the foot, and the teaching of Endoh would only conflict with this method. Further, even if one were to attempt to combine the teachings and use the method of Endoh to obtain three-dimensional information from the moire' image of Gould, this method would still base the foot measurement upon an image generated by shining light at the bottom of a foot rather than from an imprint.

Independent Claim 9

Amended Claim 9 presents a method of determining the size and shape of a foot using image data of an imprint of a foot generated from a compressible member. This includes calculating the depth at any point of the imprint using luminance values and the absolute slope of the luminance.

Applicant asserts that neither Gould nor Endoh teaches or suggests a method of using luminance and absolute slope of luminance to generate depth information from an imprint. Gould only teaches using moire' fringe pattern information to determine the size of a foot and the height of areas of a foot. As indicated therein, the size of the foot is determined by measuring the distance between moire' fringes, and the height is determined by the spacing of the grating lines (Col. 6, lines 56-68). Thus, Gould does not teach or suggest using luminance values to obtain depth information.

Further, as indicated above, Endoh only teaches comparing information regarding adjacent pixels. Endoh does not teach or suggest calculating depth from luminance values, including by using a calculated slope of the luminance.

Appl. No. : 09/684,150
Filed : October 6, 2000

Dependent Claims 2-8 and 10-13

Claims 2-8 and 10-13 are believed allowable for at least the reason they depend from an allowable independent claim. In addition, however, these claims are believed to define patentable subject matter.

Applicant asserts that the various features claimed in Claims 2-3 are not obvious to one of ordinary skill in the art in view of the combination of Gould with Shishizuka. Gould teaches a method of determining the shape of a foot from a moire' pattern. In accordance with the method, grey-scale image information is used. (Col. 6, lines 20-22). Thus, Gould teaches a method of determining the size of a foot using grey-scale information.

Shishizuka teaches a method for determining if an input image is a color or monochromatic image.

As the Examiner knows, there must be a suggestion to combine references. Applicant asserts that there is not only no suggestion to combine the teaching of Shishizuka with Gould, but that Gould teaches away from such a combination. In particular, Gould specifically teaches a method of determining the shape of a foot from a grey-scale image defining a moire' fringe pattern. Thus, Gould does not even teach a method in which color image information exists. Combining the teaching of Shishizuka with Gould only results in a determination that the input image of Gould is a monochromatic image. The combination in no way suggests obtaining color information of an imprint for use in determining the size and shape of a foot from a foot imprint.

Dependent Claim 4 recites the step of determining depth of imprint information from the "Y" component of collected pixel information. Applicant asserts that the prior art does not teach or

Appl. No. : 09/684,150
Filed : October 6, 2000

suggest using only the “Y” component of color pixel image information to determine depth. As described above, Gould specifically teaches a different manner of obtaining depth information: by counting fringes.

Claim 5 recites a method of generating an altered image of a foot imprint in determining size of the foot. Applicant asserts that various features claimed in these claims are not disclosed or suggested by Gould or Endoh. In accordance with the present invention, the imprint image may be enhanced by appropriate filtering of the stored image and subsequent addition or subtraction of the image from an original image to create an altered image. Such an altered image may emphasize the edge areas of a foot or may emphasize the interior portions of the foot for obtaining better results in the measurement of the foot.

Applicant asserts that neither Gould or Endoh suggest or teach generating such an altered image from a captured image. In accordance with Gould, the “captured image” “contains the topographically encoded height and shape information carried by the moire fringes, which information may be determined by computerized analysis of the image.” (6:40-45). Thus, Gould teaches obtaining information directly from the moire’ image and not from an altered image.

Claim 6 recites the additional step of filtering the altered image. Applicant asserts that neither Gould or Shishizuka teach or suggest an image through a filter.

Applicant asserts that dependent Claims 10 and 11 are patentable for similar reasons to Claims 2 and 3. These claims recite a method of determining a depth value at one or more points by a linear function of the luminance value and absolute slope of the luminance value at one or more points. The method disclosed by Tamura does not disclose a method of determining a depth value.

Appl. No. : 09/684,150
Filed : October 6, 2000

The teaching of Tamura to which the Examiner refers (9:16-65) only discloses equations to determine compensation gain and compensation coefficients for the relationship between the luminance signal Y and the gradation-compensated luminance signal Y' . This disclosure does not suggest obtaining depth information from luminance and slope of luminance values.

Further, Claim 11 recites a method of modifying a luminance value and its slope by a first and a second coefficient. Once again, Applicant asserts that Tamura does not disclose such first and second coefficients that modify a luminance or slope of the luminance. Rather, Tamura discloses a gradation compensation coefficient to calculate the compensation gain (Y/Y'), (9:16-18). It is apparent that the use of the coefficients differs significantly in their respective equations. It would be non-obvious to one skilled in the prior art to conceive of coefficients related to determining the depth of a foot imprint by way of the luminance and absolute slope of the luminance given equations and coefficients that govern a gradation compensation circuit (9:12-16). Hence, Claim 11 is non-obvious to one skilled in the prior art in view of the combination of Gould and Tamura.

New Independent Claim 19

New independent Claim 19 recites a method of determining the shape and size of a foot from a foot imprint. The method includes calculating curvature of the foot from curvature of imprint information. This information is obtained by determining changes in imprint depth. The depth information is obtained luminance information obtained from RGB color image data. In addition, the method includes the step of filtering the image information and obtaining dimension or foot size information by measuring the filtered image.

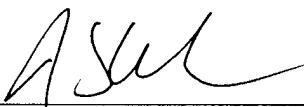
Appl. No. : 09/684,150
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Applicant asserts that this claim is patentable over the prior art for like reasons to those set forth above.

Summary

Applicant asserts that Claims 1-13 and 19 are in a condition for allowance and respectfully requests a notice as to the same. If any matters remain outstanding, the Examiner is invited to contact the undersigned by telephone.

Respectfully submitted,

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